UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,974	03/12/2001	Kenji Hagiwara	010315	6944

38834 7590 01/07/2005

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER	
SHAAWAT, MUSSA	
ART UNIT	**PAPER NUMBER**
2128	

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/802,974	HAGIWARA ET AL.	
	Examiner	Art Unit	
	Mussa A Shaawat	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 September 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☒ Claim(s) *5-8* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 March 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This application has been examined.
2. Claims 1-8 have been examined.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 1 and 2 are rejected under 35 U.S.C. 103(a) as being obvious over Keum-Shik Hong et al ("Object-oriented Modeling for Gasoline Engine and Automatic Transmission Systems", Wiley Interscience, Computer Applications in Engineering Education, Vol. 7, Issue 2, Pages 107-119, July 27, 1999), herein referred to as Hong in view of Scott A. Munns ("Computer Simulation of Powertrain Components with Methodologies for Generalized System Modeling", Master of Science Thesis at the University of Wisconsin-Madison, 1996), herein referred as Munns in further view of Diana Yanakiev et al (Engine and Transmission Modeling for Heavy-Duty Vehicles, May 1995), herein referred as Yanakiev.

6. As per claim 1 Hong discloses a simulator having computer-aided design programs for verifying an algorithm of a shift controller of an automatic transmission

mounted on a vehicle having a change-speed system and associated hydraulic actuators to transmit power generated by an internal combustion engine to drive wheels based on at least throttle opening and vehicle speed in accordance with the algorithm (see abstract, engine/transmission systems that are analyzed in various computer models; page 107), comprising:

A computer, which stores the computer-aided design, programs in memory (page 109, 3rd paragraph and page 110, 3rd paragraph) and connected to the shift controller for inputting the algorithm (page 109, 3rd paragraph);

pseudo signal generating means connected to the computer for generating pseudo signals indicative of at least the throttle opening, the vehicle speed and operation signals for the hydraulic actuators and for sending the pseudo signal to the computer (page 112, figure 4 which depicts a powertrain simulation block diagram);

wherein the computer-aided design programs include:

first calculating means for calculating outputs of a first model describing the behavior of the engine (page 110, 6t" paragraph and figure 6), a second model describing behavior of the transmission (page 112, 2"d paragraph and figure 9) and a third model describing behavior of a body of the vehicle at a first calculation cycle based on the algorithm and the pseudo signals (pages 110-115, figures 6-11; the calculation cycles are inherent in Hong)

second calculating means for inputting at least the calculated outputs of the first model and the second model and for calculating an output of a fourth model describing non-linear behavior in the second model at a second calculation cycle which is shorter

than the first calculation cycle (pages 110-115, figures 6-11, the calculation cycles are inherent in Hong);

Hong does not disclose expressly the non-linear behavior of the powertrain transmission. Munns discloses the non-linear behavior (page 6, paragraph 2.2; page 7, fig. 2.1; page 8, paragraph 2.2.3; page 24, paragraph on nonlinear systems). The non-linear behavior happens only during the gearshifts of the vehicle (car). When car is moving in 1St gear, which can be described as a steady state of the car and is a linear behavior. The gearshift from 1St to the 2"d gear can be described as the dynamic state of the car and is a non-linear behavior.

It would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the teachings of Hong with the teachings of Munns for the following reasons.

The steady state of the car occurs when the car is moving in the 1st gear at a certain speed. This is a linear behavior. The dynamic state of the car occurs during a gearshift from 1^{st} gear to the 2^{nd} gear. This is a non-linear behavior. Once the gearshift is over and the car achieves a given speed, the powertrain that includes taking the load on the system as well as gearshifting and the road condition, reaches a steady state at that speed till another gearshift. It is necessary to into account these behaviors to get realistic simulation of the transmission and to get desired results for better and efficient system performance.

Hong does not disclose the algorithm verifying means for verifying the algorithm. Yanakiev teaches validating the simulation model by comparing it with the real world data (page 28, paragraph 1).

It would have been obvious to one of the ordinary skill in the art at the time of invention was made to modify the teachings of Hong with the teachings of Yanakiev in order to ensure the accuracy of the model.

7. As per claim 2 Hong discloses a simulator according to claim 1, where in the fourth model describes the behavior of the supply of oil to clutches of gears to be shifted to and from at a shift (page 113-114; the controller module, figures 9-14).

8. Claims 3 and 4 are rejected under 35, U.S.C. 103(a) as being unpatentable over Hong in view of Munns as applied to claims 1 and 2 above, and further in view of Havener.

9. As per claim 3 Hong in view of Munns as applied to claim 1 does not teach the step response relative to the input. Havener et al (herein referred as Havener), US 20030018399, teaches about the step response (Figure 7) relative to the input (Figures 3a-3d).This can be further explained as it applies to the car. When the car is moving in first gear, there is no non-linear behavior evident and this can be described as a steady state of the car. During the gearshift from 1st gear to the 2"d gear the non-linear behavior occurs and this can be described as the dynamic state of the car. Once the gearshift is over and the car achieves a given speed, the powertrain which includes taking the load on the system as well as gear shifting reaches a steady state at that speed until another gearshift.

It would have been obvious to one of ordinary skill in the art at the time of invention was made to modify the teaching of Hong and Munns with the teachings of Havener for the following reasons. The steady state of the car occurs when the car is moving in the 1st gear at a certain speed. This is a linear behavior. The dynamic state of the car occurs during a gearshift from 1st , gear to the 2nd gear. This is a non-linear behavior. Once the gearshift is over and the car achieves a given speed, the powertrain that includes taking the load on the system as well as gearshifting and the road condition, reaches a steady state at that speed till another gearshift. It is necessary to account these behaviors to get realistic simulation of the transmission and to get desired results for better and efficient system performance.

10. As per claim 4 Hong in view of Munns and in further view of Havener teaches the step response relative to the input as explained above for claim 3. The hydraulic oil behavior is a part of the gearshift behavior.

Allowable Subject Matter

11. Claims 5-8 are objected to as being dependent upon a rejected base claim (and assuming all other rejections are traversed), but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. Applicant's arguments filed have been fully considered but they are not persuasive.

In the remarks, the applicant argues in substance that; A) Hong does not teach calculating an output model describing a second calculation cycle which is shorter than the first calculation cycle.

In response to applicant's argument, the examiner respectfully submit that Hong teaches calculating torque phase and inertia phase (see page 115) based on the first calculation of the three models that describe the behavior of the engine (see Page 110 Engine Module section, and page 117 Engine Dynamics Equation section), the behavior of the transmission (see page 110-112, Automatic Transmission Module section, and Automatic-Transmission Dynamics Equation section) and the behavior of the driveline (i.e. behavior of a body of a vehicle) (see page 113 Drive Line Modules section, and page 118 Drive line Dynamics equations section). The second calculations use the values calculated by the first calculation of the models mentioned above and therefore have a shorter calculation cycle. Furthermore the claim does not specify what the inputs of the calculation algorithm are or how the values are calculated i.e. using which equations and therefore the torque phase and inertia phase calculation of Hong meets the scope of the claimed limitation "calculating an output model describing a first calculation cycle which is shorter than the first calculation cycle".

In light of the foregoing arguments, the 35 USC 103 rejection is hereby sustained.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Weeks et al ("Automotive Engine Modeling for Real-Time Control Using MatlabSimulink", SAE paper no. 950417, March 1995).

Michelena et al ("Optimal Model-Based Decomposition of Powertrain System Design", ASME, Journal of Mechanical Design, December 1995).

Frederiksson et al ("Nonlinear Control applied to Gearshifting in Automated Manual Transmissions" no date).

Aoki et al (US 4,942,787), Saito et al (US 6,275,760), and Imai et al (US 5,128,868).

Communication

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mussa A Shaawat whose telephone number is (571) 272-3785. The examiner can normally be reached on Monday-Friday (8:30am to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jean R Homere can be reached on (571) 272-3780. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mussa Shaawat
Patent Examiner
December 27, 2004

JEAN HOMERE
SUPERVISORY PATENT EXAMINER